The essay concludes with a comparison of Scheele with Shakespeare, somewhat to the disparagement of the poet, and with a very comical lament that so few people ever visit either Scheele's birthplace, "if it still be in existence," or his shrine at Köping, "where he died and where presumably his remains are interred." One might even suspect that Mr. McIntosh had not been there. A. S.

Use-Inheritance; Illustrated by the Direction of Hair on the Bodies of Animals. By W. Kidd. 8vo. pp. 47. Illustrated. (London: A. and C. Black, 1901.) Price 2*s.* 6*d.* net.

EVERY naturalist who has studied the ungulate mammals must have been struck with the curious variation in the direction of the hair which occurs even in closely-allied species, and has probably been much puzzled to account for these differences. Why, for instance, do the hairs on the back of all the Asiatic buffaloes point towards the head and those of their African allies in the opposite direction? In the former animals, as in all analogous instances, a whorl (in this case on the haunches) marks the point where the change in the direction of the hairs from the normal backward slope occurs. In the work before us the author, although he has not attempted to give a reason for the variation in the hair-slope of closely allied species, has done good service by classifying these "whorls" and "featherings," as typified in the horse. He has also shown that these features always occur at spots where two or more muscles are acting against one another, as is well exemplified on the forehead of the horse. It is therefore suggested that the production of such whorls has a dynamical origin. It is noteworthy that while whorls and featherings are very commonly developed in short-haired mammals, they are either absent or rudimentary in those with long hair.

The main argument of the book is, however, connected with certain peculiarities of the hair-slope in man. In normal instances this slope on the back of the head and neck diverges obliquely from the middle line, somewhat after the simian fashion. But in a second, or "exceptional," type the direction is just the reverse of this. It is suggested that while the normal type has been directly inherited from simian ancestors, the exceptional type (which is considered to be an acquired one) has been derived from the female line. It is further shown than on the human back the direction of the hair-slope is quite different from that which obtains in all apes and monkeys. "This aberration of hair-slope I have suggested," writes Dr. Kidd, "to be produced by the habit which man has of spending about a third of his life, during sleep, in lying mostly on his side, and, for some millenniums at least, with some sort of rest for his head."

These peculiarities in the hair-slope of man and other animals, adds the author, are congenital and not due to selection; hence, unless originally created with the forms of life in which they occur, they must have been produced in their ancestors by use or habit. From this it follows that, if the creation hypothesis be discarded, in this particular instance, at any rate, acquired characters are inherited.

While claiming recognition for his own views on this point, Dr. Kidd (p. 8) deprecates the idea that they militate seriously against the merits of Weismann's theory as a whole. It may be added that the language in which this tribute to a great thinker is couched would have been more elegant had the author avoided the triple use of the word "which" in a single sentence. R. L.

Foundations of Botany. By Joseph Y. Bergen, A.M. Pp. x + 257. (Boston, U.S.A.: Ginn and Co., 1901.)

THIS book is intended, or at least so we gather from the preface, to provide a year's work in an advanced school class. Much of the matter is to be commended, and some of the new figures are admirable. From this side the Atlantic one can only regard with envy the amount of energy expendable in American schools if a work of this proportion and scope is really suited to their possible requirements; for the book covers a wide range of subjects, and will make no small demands on the time of the student who aims at mastering its contents. The author clearly intends that the work shall be grappled with thoroughly, and from the concrete and practical side. He gives directions for laboratory work, and suggests problems to be solved by observation and experiment. These are incorporated in the text as appendices to the chapters, after the prevailing fashion in modern American text-books. It may, perhaps, be questioned whether the book might not be improved by the separation of the purely systematic portion into a volume by itself.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Exploration of the Atmosphere over the Ocean.

THE experiment of flying kites in calm weather from the deck of a moving tug-boat, which was mentioned in NATURE of September 5 (p. 453), was continued by my assistant, Mr. Sweetland, and myself on a steamship that performed the voyage from Boston to Liverpool between August 28 and September 5. Flights were made on five days, the greatest height reached by the meteorograph being one-third of a mile, and the records of barometric pressure, air-temperature, relative humidity and wind-velocity, which are probably the first to be obtained above the North Atlantic, were shown to Section E of the British Association at Glasgow.

These experiments demonstrate conclusively that, with a steamer that can be manœuvred at will, kites can be flown at sea in almost all weather conditions, and, consequently, a most important field is opened for their use in meteorological researches, especially in the tropics, where the conditions existing above the trade-winds are imperfectly known. It is to be hoped, therefore, that such an investigation will be undertaken either by the Government or by private enterprise, and I am now endeavouring to bring this about. A. LAWRENCE ROTCH.

Blue Hill Observatory, Hyde Park, Mass., U.S.A., October 25.

A Curious Flame.

THE kind of phenomenon described by Mr. Garbutt (p. 649) is frequently to be met with in "washed-out" flames, that is, in flames which are diluted to the point of extinction. In such cases the velocity of inflammation is so low that flame cannot propagate itself against the stream of gas. If the current of gas be baffled by an obstacle, then a flame may originate in the "slack waters" round the obstacle. No doubt the temperature of the obstacle is of some importance if the object be small, since rapid withdrawal of heat at any point of a gaseous current is a hindrance to the development of flame at that point. But it will be found that in the experiment described by Mr. Garbutt a flame may be obtained by opposing a large baffling surface of even an enduringly cold body such as a 56-pound weight. In this case a very large portion of the gaseous mixture is made stationary and the cooling down does not affect more than a small film next the metal. A kindred phenomenon is described in NATURE (vol. xlix. p. 86).

The flame obtained when a Bunsen lamp is lighted both at the bottom and the top of the tube is very feeble, and large tracts of it may be extinguished by holding in it beads of volatile salts. ARTHUR SMITHELLS.

November 4.

WITH regard to the flame described by Mr. Garbutt in your issue of October 31, I would suggest the following explanation, which, however, I have not as yet quite proved.

The products of the partial combustion at the bottom of the

Bunsen tube will, in this case, burn with the aid of external heat; but not without some such assistance, because the heat of combustion is so much absorbed by the diluting gases that the temperature of ignition would not otherwise be maintained.

The experiment reminds one of the burning of ammonia, and of a coal-gas flame rendered non-luminous by the admission of steam.

A consideration of Prof. Smithells' method of cone separation by a glass rod (*vide* NATURE, November 1892) might lead to the suspicion that the obstruction of the rod played some part in the phenomenon, but the above explanation is supported by the fact that the copper wire which, when cold, extinguishes a candle flame, does not, when warm, do so.

HERBERT KING.

The School, Wolverhampton, November 2.

The Colours of Guillemots' Eggs.

I AM glad to see that my friend Captain Barrett-Hamilton has written on the above subject, though it seems inconceivable to him that "the beautiful varieties of colouring must help each bird to distinguish her egg from others lying near until they all become stained and soiled." The quotation is from "The Birds of Ireland" (p. 364), in which I put forward, as an opinion, the conclusion that I have been led to after many a day spent in climbing among breeding guillemots.

Discussion of such opinions is to be welcomed, but they must be tested by close observation of the birds and their ways; and the guillemot finding its own egg among many is not the same thing as an animal finding its young, which has voice, smell, movement and expression, nor has the guillemot a nest to find.

It is asked, "Why should each guillemot be provided with a conspicuous private egg-pattern when other sea-birds, her neighbours, have to find their homes without such aid?"

Well, let anyone look down on a guillemot-ledge the last week in May, before the birds have begun to sit close, and he will be struck by the fact that each is provided with a conspicuous egg-pattern, the green eggs contrasting with the white ones and those heavily blotched with the streaked ones; and this is most obvious, even at some distance. I know no other eggs that show such vivid contrasts.

Does this contrast supply any want that the guillemot may have above other birds to enable it to find its egg? Her neighbours, my friend remarks, find their homes without such aid. But then each has her "home." The gulls and cormorants have their nests. Each puffin has its burrow. The razorbills lay much more in separate nooks than guillemots, but still they approach nearest to them both in the nature of their breeding places and in the varieties of egg-colouring. But guillemots lay and sit in packs, often touching one another, on open surfaces of rock (see the plate, "Birds of Ireland," facing p. 362). At first the eggs are often left uncovered and other guillemots alight, lay beside them, and they roll more or less. Must not the special colouring greatly enable the parent bird to find her egg while this is going on? Why should we deny her intelligence in a matter that concerns her, even though other birds are satisfied if they know the way to their nests and do not seem to distinguish whether the eggs in them are their own or not. Thus the cuckoo's egg is unquestioningly accepted by the foster-mother.

It is objected that my suggestion about the colour helping guillemots to distinguish their eggs is disproved by the subsequent admission that they all become stained and soiled as incubation advances; but at that stage each bird clings to her treasure and never leaves it, unless her mate relieves her (a point which needs proof).

The colouring of the eggs of this species is not protective, for it makes them gaudy. It is peculiar, and why should it not be useful during laying-time considering the very peculiar conditions under which guillemots breed? They sometimes come down with a thump among others which are hatching, they sometimes fight, they are awkward on their feet; eggs are not only moved, but many are thrown down, broken or lost in pools.

I wish some ornithologist would contrast from observation the guillemots' colonies on surfaces of rock with those of other birds that breed in packs without nests. Penguins appear to lay on earth and leave lanes between the nesting-places on which the birds travel on foot. That being so, their eggs would not be in such danger of being rolled about.

Cappagh, co. Waterford. R. J. USSHER.

THE TERCENTENARY OF TYCHO BRAHE'S DEATH.

ON October 24, 300 years had elapsed since Tycho Brahe died at Prague, expressing in his last moments the hope that he might not appear to have lived in vain. When saying this he doubtless did not fear that the work he had accomplished might not turn out to be of permanent value, but merely regretted that the great goal he had looked forward to from his early youth, the complete reformation of astronomy, had not yet been fully reached. Could he have foreseen how brilliantly Kepler, who stood at his deathbed, was to complete the work, Tycho would have had no fear as to the lasting nature of his reputation.

It is difficult nowadays to realise that only a little more than 300 years ago it was not a self-evident proposition that the science of astronomy could only be firmly established by observing the heavens systematically year after year, and not merely by taking an odd observation now and then. And yet this does not appear to have occurred to anybody before Tycho, as even Copernicus records very few observations taken during his long life, so that the values of most astronomical quantities had still to be borrowed from Ptolemy. But in August 1563 the young Danish noble, then a student at the University of Leipzig, only sixteen years of age, commenced the series of observations which he carried on, with few interruptions, till the end of his life, thirty-eight years later. The instruments he used at first were crude enough, but already at that time the future reformer of practical astronomy was aware that a very inferior instrument may produce good work if all sources of possible errors are investigated and corresponding corrections are applied to the results of the observations. It is also worth noticing that the planets almost from the beginning claimed his undivided attention, so that the youthful observer had perceived that the existing planetary tables could only be improved if the computed places of the planets were systematically compared with observed places and the errors of the tables thus brought to light. Thanks to the great liberality of King Frederic II. of Denmark, Tycho was afterwards able for more than twenty years, with a multitude of instruments of improved construction and assisted by a number of pupils, to follow the motions of the sun, moon and planets, while he at the same time, by his observations of a thousand fixed stars, gave to the world a catalogue of accurate positions of these bodies which took the place of the old catalogue of Ptolemy and held its own for more than a hundred years, until the use of telescopes and clocks of precision enabled Flamsteed to produce much better star places.

That Kepler made use of Tycho Brahe's observations to find the laws which govern the planetary motions and thereby to free the Copernican system from the excentric circles and epicycles which it had taken over from the Ptolemean system is too well known to require repetition here. But Tycho did a great deal more than merely amassing materials for his successor. Not only was he the first observer who did not assume his instruments to be faultless but who studied their errors of construction, but he was also the first to investigate refraction and to attempt to correct his observations for it, and he succeeded in improving his instruments so much that it is difficult to see how a much greater accuracy could have been attained by succeeding generations, if the telescope had not been invented a few years after his death and if the application of the pendulum to clocks had not simplified many methods of observing. And Tycho was able to deduce many important results from his own observations. By showing that the comets

1 "Tychonis Brahe Dani die xxiv Octobris A.D. MDCI defuncti operum primitias De Nova Stella summi civis memor denuo edidit Regia Societas Scientiarum Danica. Hauniæ, die xxiv Octobris A.D. MDCCCCI." Pp. 16 + 54 ff. + pp. 30; 2 plates.